

Claims:

1. A fastener extractor comprising:
 - a receiving end having an interior bore and a central axis;
 - a plurality of helical ridges extending along said bore, curving
5 radially and inwardly towards said central axis;
 - a transition area having a plurality of arcuate surfaces projecting
inwardly toward said central axis; and
 - an attachment end extending from said transition area, said
attachment end being adapted to engage an extraction tool;
 - 10 wherein said plurality of ridges is adapted to engage a fastener
to be removed.
2. The fastener extractor of claim 1 further comprising a plurality of
arcuate grooves that extend along said interior bore wherein said adjacent
ones of said plurality of arcuate grooves form said ridges.
- 15 3. The fastener extractor of claim 1 further comprising a rim formed
on said receiving end.
4. The fastener extractor of claim 3 wherein said rim further
comprises a smooth cylindrical opening.
5. The fastener extractor of claim 3 further comprising a plurality of
20 depressions spaced apart from each other and formed on said rim.
6. The fastener extractor of claim 5 wherein said plurality of
depressions are approximately equidistantly spaced apart.
7. The fastener extractor of claim 3 further comprising a plurality of
segments spaced apart from each other and formed on said rim.
- 25 8. The fastener extractor of claim 7 wherein said plurality of
segments are approximately equidistantly spaced apart.
9. The fastener extractor of claim 1 wherein said arcuate surfaces
are smooth, radiused surfaces.
10. The fastener of claim 1, wherein said arcuate surfaces are
30 angular.
11. The fastener extractor of claim 1, wherein said attachment end
further comprises a polygonally-shaped outer surface.

12. The fastener extractor of claim 1, wherein said attachment end further comprises a cylindrical outer surface.

13. The fastener extractor of claim 1, wherein said attachment end further comprises an attachment means.

5 14. The fastener extractor of claim 13, wherein said attachment means is a receptacle.

15. The fastener extractor of claim 13, wherein said attachment means is a male attachment structure.

10 16. The fastener extractor of claim 3, wherein said interior bore and said plurality of grooves define a generally frusto-conical receiving area that angles inwardly between about one and eight degrees inclusive to said transition area.

17. The fastener extractor of claim 1, wherein said interior bore has six arcuate grooves.

15 18. The fastener extractor of claim 3, wherein each of said plurality of surfaces of said transition area is generally perpendicular to a longitudinal axis of each of said grooves.

19. A kit for extracting fasteners comprising:

20 a plurality of fastener extractors; each one of said plurality of extractors comprising:

an attachment end having an attachment means for connection to an extraction tool;

25 a receiving end having an interior bore that angles inwardly towards said attachment end, said interior bore having a central axis and including at least two arcuate grooves that extend along said interior bore towards said attachment end, said arcuate grooves curving radially and inwardly towards said central axis of said interior bore, wherein adjacent ones of said arcuate grooves form sharp helically shaped ridges;

30 a transition area positioned between said attachment end and said receiving end, said transition area having a plurality of arcuate surfaces, each of said plurality of arcuate surfaces corresponding to a

respective one of said arcuate grooves and projecting inwardly from said corresponding groove towards said central axis;

wherein said interior bore is engageable over a fastener to be extracted.

5 20. The kit of claim 19 further comprising an extraction tool adapted to engage said attachment end.

21. The kit of claim 20 further comprising an extraction tool selected from one of a socket wrench, a wrench, and a screw driver.

10 22. The kit of claim 19 further comprising a container adapted to receive said plurality of fastener extractors.

23. The kit of claim 22 wherein said container is made from plastic.

24. The kit of claim 19 further wherein said plurality of fastener extractors includes a plurality of sizes for said receiving end.

15 25. The kit of claim 24 wherein said plurality of sizes are approximately 1/8-inch to approximately 1-inch.

26. The kit of claim 25 wherein said plurality of sizes are approximately 9/16-inch, 5/8-inch, 11/16-inch, 3/4-inch, 1/2-inch, 7/16-inch, 3/8-inch, 5/16-inch, and 1/4-inch

20 27. The kit of claim 19 wherein said plurality of fastener extractors includes a plurality of sizes for said attachment means.

28. The kit of claim 19 wherein said arcuate surfaces are smooth, radiused surfaces.

29. The kit of claim 19, wherein said arcuate surfaces are angular.

25 30. The kit of claim 19, wherein said attachment end further comprises a polygonally-shaped outer surface.

31. The kit of claim 19, wherein said attachment end further comprises a cylindrical outer surface.

32. The kit of claim 19, wherein said attachment means is a receptacle.

30 33. The kit of claim 19, wherein said attachment means is a male attachment structure.

34. The kit of claim 19, wherein said interior bore and said plurality of grooves define a generally frusto-conical receiving area that angles inwardly to said transition area between approximately one and eight degrees inclusive.

5 35. The kit of claim 34, wherein said frusto-conical receiving area angles inwardly at approximately four degrees.

36. The kit of claim 19, wherein said interior bore has six arcuate grooves.

10 37. The kit of claim 19, wherein each of said plurality of surfaces of said transition area is generally perpendicular to a longitudinal axis of each of said grooves.

38. The kit of claim 19 further comprising a plurality of arcuate depressions spaced apart from each other, formed on said receiving end.

15 39. A method of extracting a fastener comprising:
providing a fastener extractor having a receiving end, a transition area, and an attachment end, said receiving end including a plurality of arcuate grooves extending inwardly and radially toward a central axis of said receiving end, wherein adjacent ones of said arcuate grooves form sharp helical ridges, said transition area including a plurality of arcuate surfaces,
20 each of said plurality of surfaces corresponding to a respective one of said arcuate grooves and projecting inwardly from said corresponding groove towards said central axis;

engaging said receiving end of said fastener extractor with said fastener to be removed; and

25 rotating said fastener extractor;

wherein the rotating of said fastener extractor relative to said fastener causes said ridges of said fastener extractor to engage said fastener and causes loosening of said fastener.

30 40. The method of claim 39 further comprising:
engaging said attachment end with an extraction tool.

41. The method of claim 40 wherein rotating said fastener extractor further comprises:

rotating said fastener extractor with said extraction tool.